

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Tachographs

We, KIENZLE APPARATE G.m.b.H. a German Body Corporate, of Villingen, Schwarzwald, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a vibratory device for tachographs and similar recording instruments for the drive of a writing device recording driving times in the form of a bar diagram, consisting of a pendulum ball of a vibratory pendulum, responding to the vibrations due to the operation of a vehicle, and of a pendulum spring in operative connection with this pendulum ball, which pendulum spring can be regulated for all possible installation positions of the tachograph so that its line of action coincides with the line of action of gravity.

The vibratory device hitherto used in tachographs for the drive of a writing device recording the driving times of a vehicle in form of a bar diagram was substantially a simple pendulum retained by a tension spring against the action of gravity. This vibrator pendulum is generally arranged with respect to its vibration plane in the tachograph so that no special coupling means is necessary between the vibratory pendulum and the writing device. That means it is arranged parallel to the recording plane and, consequently, in most of the tachograph types used today also parallel to the front side of the tachograph casing and parallel to the dial.

This kind of vibratory device, however, has the disadvantage that the vibratory pendulum can only swing in a satisfactory manner, when it is installed almost vertically. This applies specially when the pendulum spring is rigidly mounted in the

vibration plane of the pendulum, and as hitherto usual its pretension can be regulated within certain limits only.

The motor vehicle industry, however, today prefers a horizontal installation of the tachographs in the vehicle or an installation with the frontside only slightly inclined towards the horizontal. Therefore, it is necessary to enable the vibratory pendulum to swing also in these installation positions if, for cost reasons, one does not want to give up the constructional principle of arranging the vibratory pendulum parallel to the recording surface.

For this purpose, an arrangement is already known according to which that end of the pendulum spring which is not fastened to the vibratory pendulum, is fastened to the open end of a lever, adjustably mounted on a stationary axis. By adjusting the lever the pendulum spring can be adapted for each desired installation position of the tachograph in such a manner that it carries the weight of the vibratory pendulum, that means that its line of action coincides with the line of action of the gravity.

By adjusting the pendulum spring according to the installation position not only an increase of the frictional moment by the irregular bearing load with a nearly horizontal installation of the tachograph is avoided, but also the sensibility of the vibratory pendulum is increased since the component of the pendulum spring acting on the vibratory pendulum in vibration direction in case of a horizontal installation, is zero with the vibratory pendulum stationary.

The increased sensibility of the vibratory pendulum is especially desirable with the horizontal installation of the tachograph since in this installation position the vibratory pendulum is only actuated by the longitudinal or transverse accelerations of the

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body of the vehicle, which are relatively low in energy. The known arrangement for adjusting the pendulum spring to the direction of gravity has the disadvantage, however, that when another adaptation to an installation position which was not determined before, is required, instruments which are ready for installation must be opened in order to effect a purely intuitive and superficial adjustment on the site of installation. On the other hand, it is already necessary during the production process to maintain a separate order and stock holding for the different installation requirements, resulting in additional and not justifiable cost.

According to the present invention there is provided a vibratory device for tachographs and similar recording instruments for the drive of a writing device, recording the driving times of a vehicle in the form of a bar diagram, consisting of a pendulum ball of a vibratory pendulum, operated by the vibrations due to the movements of the vehicle when the engine of the vehicle is running, and a pendulum spring in operative connection with the pendulum ball, which pendulum spring can be adjusted in all possible installation positions of the tachograph so that its line of action coincides with the line of action of gravity, wherein the pendulum spring is adjusted by an auxiliary pendulum rotatable in a vertical plane, being perpendicular to the vibration planes of the pendulum ball determined by the possible installation positions.

The technical advantage obtainable by this invention is especially to be seen in that the pendulum spring, in each installation position of the tachograph, is automatically adjusted to the required vertical direction by the auxiliary pendulum. Additional adjusting work on the installation spot and during the manufacture as well as separate stock-keeping of tachographs for different installation requirements is thereby eliminated.

In the following, the vibratory device according to the invention is described more in detail with reference to the drawings.

Figure 1 is a diagrammatic representation of the vibrator device; and

Figures 2a, 2b and 2c show the functional positions of the vibratory pendulum and the auxiliary pendulum in three different installation positions of the tachograph.

The vibratory pendulum 1 consisting of the pendulum arm 2 and the pendulum ball 3 is rotatably carried by means of a bearing bushing 4 provided on the pendulum arm 2, on an axis 5 mounted in the casing of the tachograph. The pendulum arm 2 of the vibratory pendulum is furthermore provided with a writing arm 6 at the open end of which, having the shape of a bearing bridge, the writing stylus 7 is elastically mounted,

which at the moment shown in figure 1 is recording the bar diagram 9 on the diagram chart 8. Radially with reference to the axis 5 a pin 10 with a guide groove 11 is mounted at an appropriate place. On the same line as pin 10 another axis 12 is arranged in the casing of the tachograph on which the auxiliary pendulum 13 is rotatably mounted by means of the bearing bushing 14. The auxiliary pendulum is a two-arm lever at which on the one hand the pendulum ball 15 is provided and which, on the other hand, consists of two parts which are laterally displaceable against each other, and the one part 16 of which carries a pin 17 with a guide groove 18 at its extreme end. In the guide grooves 11 and 18 of the pins 10 and 17 one end each of the pendulum spring 19 is suspended. Thus the pin 10 forms an axis of rotation for the spring 19.

In figure 2a the vibrator pendulum 1 is shown swinging in a horizontal plane. The pendulum swings preferably under the influence of the longitudinal accelerations of the vehicle. The pendulum spring 19, i.e. its line of action, is adjusted to gravity (S) by the auxiliary pendulum 13. The weight of the pendulum 1 is carried by the pendulum spring 19 so that it counteracts the tilting moment on the bearing bushing 5. Figures 2b and 2c demonstrate other possible positions of the vibrator device, the vibrator pendulum 1 in fig. 2c swinging in a horizontal plane and the pendulum spring, same as in figure 1, being automatically adjusted to the vibration plane.

WHAT WE CLAIM IS:—

1. A vibratory device for tachographs and similar recording instruments for the drive of a writing device, recording the driving times of a vehicle in the form of a bar diagram, consisting of a pendulum ball of a vibratory pendulum, operated by the vibrations due to the movements of the vehicle when the engine of the vehicle is running, and a pendulum spring in operative connection with the pendulum ball, which pendulum spring can be adjusted in all possible installation positions of the tachograph so that its line of action coincides with the line of action of gravity, wherein the pendulum spring is adjusted by an auxiliary pendulum rotatable in a vertical plane, being perpendicular to the vibration planes of the pendulum ball determined by the possible installation positions.

2. A vibratory device for tachographs and similar recording instruments according to claim 1 wherein the rotatable auxiliary pendulum is carried on an axis mounted in the casing of the tachograph, and is shaped as double-arm lever, the one arm of which carries a pendulum ball and the other arm

of which carries a pin for the suspension of the pendulum spring.

3. A vibratory device according to claim 2 wherein the rotation axis of the auxiliary pendulum is arranged on the same line as the pin fixed to the vibratory pendulum forming an axis of rotation for the pendulum spring, when the vibratory pendulum is stationary.

4. A vibratory device for tachography substantially as described with reference to and as illustrated in the accompanying drawing.

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